

**REMARKS**

This is a full and timely response to the outstanding non-final Office Action mailed September 20, 2004. Claims 1-30 and 51-76 were previously cancelled, claims 31-50 were previously withdrawn, and claims 105-107 have been newly added. In addition, claims 80 and 93-104 have been cancelled without prejudice, waiver, or disclaimer and claims 77 and 79 have been newly amended. Upon entry of this Response, claims 77-79, 81-92 and 105-107 remain pending in the present application.

In the Office Action, pending claims 77-80, 88, 90-95, and 103 have been preliminarily rejected as being anticipated under 35 USC§102(b). In addition, pending claims 81-87, 89, 96-102, and 104 have been preliminarily rejected for obviousness under 35 USC§103(a).

Applicants traverse all of the rejections of the Office Action. Reconsideration and allowance of the subject application and presently pending claims 77-79, 81-92 and 105-107 is respectfully requested. In addition, the Applicants wish to express their sincere appreciation for the time that the Examiner has spent with Applicants and the Applicants' Attorney during telephone discussions. Thus, the Applicant respectfully request that the Examiner carefully consider this response and the amendments.

**I. Response to Claim Rejections based on Anticipation**

In the Office Action, claims 77-80, 88, 90-95 and 103 have been preliminarily rejected under 35 USC§102(b) as being unpatentable over U.S. Patent No. 6,127,654 to Fletcher (hereinafter "Fletcher"). For a proper rejection of a claim under 35 U.S.C. Section 102(b), the

cited reference must disclose all elements/features/steps of the claim. See, *e.g.*, *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 7 USPQ2d 1129 (Fed. Cir. 1988).

With regard to the above-mentioned preliminary rejection of claims 77-80, 88, 90-95 and 103 based on Fletcher, the Applicants first offer a brief review of the Fletcher reference.

**A. Discussion of Fletcher Reference**

Fletcher discloses the method for manufacturing heating elements. The heating element comprises oxidized metal powder. The metal powder is oxidized more than 40 percent and preferably between 60 and 95 percent. The oxidation of the deposited metal powder is increased by either modifying the powder or modifying the deposition process, however, the deposited metal powder is oxidized prior to deposition. The powder is modified by pre-oxidation, reducing the size of particles, removing oxidation inhibitors, adding oxidation catalysts and enhancers, and increasing the surface area of the particles.

The importance of pre-oxidizing the metal powder prior to deposition is illustrated in numerous parts of Fletcher. As an example, column 5, lines 19-25 read:

As an improvement, this invention *pre-oxidizes* metal powders in a controlled oxidation reaction. The pre-oxidized metal powder is flame spray deposited on a substrate. The more uniformly oxidized metal powders result in a heating element that provides a more uniform temperature for a given thickness and a given current.

In addition, column 5, lines 36-42 of Fletcher read:

Increasing the oxidation of metal powders is contrary to conventional deposition techniques. Most techniques inhibit or reduce oxidation. Many perform deposition in a vacuum to entirely prevent oxidation. Other techniques minimize the surface area or coat the surface of the metal powders with an oxidation inhibitor.

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Fletcher clearly illustrates that the metal powders utilized in deposition are pre-oxidized. Another example of this process is shown by Column 5, lines 46-51, which read:

Tests showed that such layers perform poorly as heating elements. Further tests showed that increasing the oxidation of the metal powders substantially improved their performance as heating elements, especially where the current path was relatively short.

Fletcher is directed exclusively to the use of pre-oxidized metal powders. One reason for such focus is that Fletcher teaches increasing of oxidation of the pre-oxidized metal powders during the deposition process. In addition, Fletcher does not control introduction of oxygen to the pre-oxidized metal powders.

#### B. Claim 77

Amended independent claim 77 reads:

77. A method of making a resistive heater having a controlled resistivity, having a substrate, a resistive heating layer, and a power source, comprising the steps of:

determining a desired resistivity of said resistive heater layer;

selecting *a solid metallic component* and at least one reactant gas;

selecting a proportion of said solid metallic component and said at least one reactant gas, so that when combined said desired resistivity of said resistive heater layer results;

*promoting reaction of at least a portion of said solid metallic component and said reactant gas by melting said at least a portion of said solid metallic component resulting in a stream of molten droplets, and providing controlled introduction of said reactant gas to said molten droplets*, thereby combining said molten droplets and said reactant gas, resulting in a free metal and reaction product;

depositing said combined free metal and reaction product on said substrate to form said resistive heater layer having said desired resistivity; and

providing power to said resistive heater layer.

*(Emphasis Added)*

The Applicants respectfully submit that Fletcher fails to disclose at least the above-emphasized elements of claim 77. Specifically, Fletcher fails to disclose use of a solid

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metallic component, and Fletcher fails to disclose the step of promoting reaction of at least a portion of the solid metallic component, and the reactant gas by melting the at least a portion of the solid metallic component resulting in a stream of molten droplets, and providing controlled introduction of the reactant gas to the molten droplets, thereby combining the molten droplets and the reactant gas.

The Applicants respectfully submit that Fletcher teaches use of a pre-oxidized metallic powder and not a solid metallic component as is taught by the present invention. Specifically, Fletcher illustrates use of a pre-oxidized metallic powder in numerous sections. Examples of this include at least the following.

Column 5, lines 19-25 read:

As an improvement, this invention *pre-oxidizes* metal powders in a controlled oxidation reaction. The pre-oxidized metal powder is flame spray deposited on a substrate. The more uniformly oxidized metal powders result in a heating element that provides a more uniform temperature for a given thickness and a given current.

In addition, column 5, lines 36-42 of Fletcher read:

Increasing the oxidation of metal powders is contrary to conventional deposition techniques. Most techniques inhibit or reduce oxidation. Many perform deposition in a vacuum to entirely prevent oxidation. Other techniques minimize the surface area or coat the surface of the metal powders with an oxidation inhibitor.

The Applicants respectfully submit that claim 77 is directed toward use of a solid metallic component and not a pre-oxidized metal powder.

In addition, with regard to the step of promoting reaction, the Applicants respectfully submit that Fletcher fails to disclose the step of promoting reaction of at least a portion of the solid metallic component and the reactant gas by melting at least a portion of the solid metallic component resulting in a stream of molten droplets, and providing controlled introduction of the reactant gas to the molten droplets.

Specifically, amended claim 77 is directed toward promoting the reaction of at least a portion of the solid metallic component and the reactant gas by melting at least a portion of the solid metallic component, thereby resulting in a stream of molten droplets and providing **controlled** introduction of the reactant gas to the molten droplets, thereby combining the molten droplets and the reactant gas. The controlled introduction of the reactant to the molten droplets is based upon the selected proportion of the solid metallic component and the at least one reactant gas. Therefore, random introduction of a reactant gas is not provided by the present invention, instead it is a controlled introduction of the reactant gas to the molten droplets that provides the resulting free metal and reaction product.

The Applicants respectfully submit that the above-mentioned elements of claim 77 are not disclosed by Fletcher. Therefore, for at least for the above-mentioned reasons, the Applicants respectfully request that claim 77 be allowed.

**C. Claims 78, 79, and 81-92**

The Applicants respectfully submit that since claims 78, 79, and 81-92 depend on independent claim 77, claims 78, 79, and 81-92 contained all limitations of independent claim 77. Since independent claim 77 should be allowed as argued above, pending dependent claims 78, 79, and 81-92 should be allowed as a matter of law for at least this reason. In re Fine, 5 U.S.P.Q. 2d 1596, 1608 (Fed. Cir. 1988).

**II. Newly Added Claims**

The Applicants have added claims 105, 106, and 107, each of which provides an additional limitation to claim 77.

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**A. Claim 105**

Newly added claim 105 reads:

105. The method of claim 77, *wherein said solid metallic component is not oxidized prior to said step of promoting reaction.*

*(Emphasis Added)*

As is emphasized above, the Applicants respectfully submit that claim 105 makes clear that the solid metallic component is not oxidized prior to the step of promoting reaction. Specifically, unlike in Fletcher, the component that is utilized to promote a reaction in the present invention, is not oxidized. As an example, in Fletcher the metallic powder is preoxidized prior to deposition. Contrary to Fletcher, the solid metallic component that is utilized in the present invention during promoting reaction is not oxidized prior to the step of promoting reaction. For at least this reason, the Applicants respectfully request allowance of claim 105.

**B. Claim 106**

Newly added claim 106 reads:

106. The method of claim 77, *wherein said solid metallic component is a solid metallic wire.*

*(Emphasis Added)*

The Applicants respectfully submit that dependent claim 106 adds the limitation of the solid metallic component being a solid metallic wire. The Applicants respectfully submit that none of the prior art references disclose use of a solid metallic wire and therefore the Applicants respectfully request allowance of claim 106.

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**C. Claim 107**

Newly added dependent claim 107 reads:

107. The method of claim 77, *wherein there is no reaction of said solid metallic component with said reactant gas prior to said step of promoting reaction.*

*(Emphasis Added)*

As emphasized above, claim 107 discloses that there is no reaction of the solid metallic component with the reaction gas prior to the step of promoting reaction. Specifically, the solid metallic component utilized in accordance with the present invention is not oxidized, and, in addition, is not caused to react with any reacting gas, including oxygen and other reactant gases, prior to the step of promoting reaction. As an example, the solid metallic component is not pre-oxidized. In light of the above-mentioned the Applicants respectfully request allowance of claim 107.

**III. Response to Claim Rejections based on Obviousness**

In the Office Action claims 81-87, 89, 96-102, and 104 have been preliminarily rejected under 35 USC§103(a). The Applicants respectfully submit that claims 96-102, and claim 104 have been canceled without prejudice, waiver, or disclaimer and therefore are not further addressed herein. With regard to dependent claims 81-87 and 89, the Applicants respectfully submit that these claims depend from independent claim 77. Since independent claim 77 should be allowed as demonstrated above, dependent claims 81-87 and 89 should also been allowed, especially since the associated references utilized in the obviousness rejections for each respective dependent claim did not disclose, teach, or suggest use of a solid metallic component, nor do they promote the reaction of at least a portion of a solid metallic

component and the reactant gas by melting the at least a portion of the solid metallic component resulting in a stream of molten droplets, and providing controlled introduction of the reactant gas to the molten droplets, thereby combining the molten droplets and the reactant gas.

Since the references utilized in obviousness rejections for claims 81-87 and 89 do not fulfill the deficiency of Fletcher, the Applicants respectfully submit that dependent claims 81-87 and 89 should be allowed and allowance is respectfully requested.

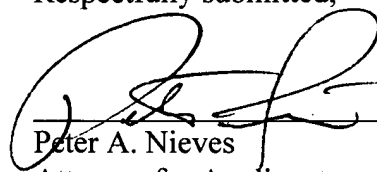
#### **IV. Prior Art Made of Record**

The prior art made of record has been considered, but is not believed to affect the patentability of the presently pending claims.

#### **CONCLUSION**

In light of the foregoing amendments and for at least the reasons set forth above, Applicants respectfully submit that all objections and rejections have been traversed, rendered moot and/or accommodated, and that presently pending claims 77-104 are in condition for allowance. Favorable reconsideration and allowance of the present application and the presently pending claims are hereby courteously requested. If in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (603) 668-1400.

Respectfully submitted,



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